

**Remarks**

Claims 9-11 were allowed in the parent application, Ser. No. 10/075,507, and are, accordingly cancelled here. Claims 1-8 and 12-13 have been amended. Claims 14-20 have been added. Claims 1-8 and 12-20 are pending.

**1. Claim Rejections – 35 U.S.C. § 102(b)**

Claims 1-8, 12 and 13 have been rejected under 35 U.S.C. 102(b) as being anticipated by Kim et al., U.S. Pat. No. 6,020,787. The Applicant traverses this rejection as follows.

To anticipate a claim under 35 U.S.C. sections 102(a), (b), or (e), the reference must teach every element of the claim. "A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1021, 1053 (Fed. Cir. 1987). See also MPEP 2131. "The identical invention must be shown in as complete detail as is contained in the ... claim."

*Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

Further any claim depending from base claims not anticipated or made obvious by the prior art also are not anticipated or made obvious by the prior art since the dependent claims comprise all of the elements of the base claims.

Kim does not teach each and every element of the independent pending claims 1, 12, 13 and 19. Thus, Applicant respectfully requests that the Examiner issue a notice of allowance for all of the pending claims.

Regarding independent claims 1, 12 and 13, the claimed "ferro-electric tunable component" the Office Action states "VVC circuit 506 which has variable capacitor 812 can be read as a ferro-electric tunable component (see spec. col. 4, lines 46-48)". Applicant has amended claims 1, 12 and 13 to state that the ferro-electric component has a "a ferro-electric material with an electrically tunable dielectric constant." At least the ferro-electric material with an electrically tunable dielectric constant distinguishes claims 1, 12 and 13 from Kim. Kim states:

The preferred voltage variable capacitor is disclosed in U.S. Pat. No. 5,137,835 (sic), filed Oct. 15, 1991 (application Ser. No. 775,111) by Kenneth D. Cornett, E.S. Ramakrishnan, Gary H. Shapiro, Ramond M. Caldwell and Wei-Yean Howng, the entire patent of which is incorporated herein by reference. However, any capacitor using a ferroelectric material which provides variable capacitance can be used.

Kim at col. 4, lines 41-47.

U.S. Pat. No. 5,173,835 to Cornett et al. (hereinafter "Cornett"), which was cited above by Kim, teaches a voltage variable capacitor. See Cornett, Fig. 1 and col. 2, line 47 to col. 4, line 14. But the voltage variable capacitor 10 of Cornett is very different from the ferro-electric capacitors and inductive elements described in the specification of the present invention and as claimed.

Specifically, Cornett describes varying the charge density in a semiconductor as the means for varying the capacitance. A high dielectric constant insulating layer 16 is used to increase the tunability of the capacitor 10, but varying the dielectric constant 16 of the insulating layer 16 is not contemplated. Cornett does state that ferro-electric materials can be used for the insulating layer 16, but even in that case, Cornett teaches that varying the charge density of the semiconductor is the means for tuning the capacitance of the capacitor 10. Cornett at col. 4, lines 15-31. Thus, neither Cornett nor Kim teaches the claimed "ferro-electric material with an electrically tunable dielectric constant". Rather, Cornett tends to teach away from the use of ferro-electric materials.

Furthermore, even though Kim states that any capacitor using a ferroelectric material which provides variable capacitance can be used, Applicant asserts that this statement refers to Cornett's statement that ferro-electric materials are "not desirable for high frequency devices". Cornet at col. 4, lines 16-17. While Kim may teach that it is acceptable to use a ferro-electric material as the insulating layer in a voltage variable capacitor that varies the capacitance by varying the charge density in a semiconductor, Kim does not teach that the dielectric constant of the ferro electric material is varied in order to vary the capacitance. Neither Kim nor Cornett mention varying the dielectric constant of the ferro-electric material.

Applicant respectfully asserts that claims 1, 12 and 13 are patentably distinct from the cited referenced for at least the reasons stated above. Claims 2-8 and 14-18

enjoy all of the distinctions over the prior art as independent claim 1, from which they depend.

Regarding claim 3, claim 3 has been amended to recite a tunable power amplifier comprising a power amplifier, and a matching circuit having a ferro-electric component, that are integrated on one substrate. Kim does not disclose or suggest a power amplifier and a matching circuit comprising a ferro-electric component that are integrated on one substrate. Accordingly, applicant submits that claims 3 is not anticipated or rendered obvious by Kim.

The integration of the power amplifier matching circuit (with its ferro-electric component) and power amplifier on one substrate provides numerous advantages. These advantages are fully set forth in the specification and include reduction of the overall loss associated with the integrated device compared to that arising from using discrete parts, thus making it easier to meet specifications, and reduction of the parts count and overall footprint, leading to reduced costs (specification, paragraph 37).

Another important advantage derived from integrating the matching circuit and power amplifier is that the impedances of the power amplifier and a component coupled to the output of the power amplifier, such as an isolator, can be naturally matched (specification, paragraph 43). The ability to match the natural output impedance of one device to the input impedance of another device decreases loss in the matching circuit and reduces circuit complexity (specification, paragraphs 44-45). When impedances are naturally matched the constituent ferro-electric components are exposed to relatively lower RF voltages for given powers. Ferro-electric films are typically non-linear, and the reduced RF voltage leads to reduced non-linear distortion. Consequently, the ferro-electric components can be subjected to increased power while maintaining an acceptable level of non-linear distortion. The use of integrated components operating at lower input and output impedances (naturally matched) allows ferro-electric components to be incorporated in applications where higher power levels are required than is typically possible using ferro-electric components matched to the industry standard 50 ohms (specification, paragraphs 79-80).

New claims 14-16, depending from claim 1, and claims 17-18, depending from claim 13, are directed specifically to matching to the natural impedance of a power

amplifier, which is related to integrating the power amplifier with the matching circuit but does not require integrating the power amplifier with the matching circuit. Claims 14 and 17 recite that the matching circuit matches the natural impedance of the power amplifier to the natural impedance of a component coupled to the output of the power amplifier, thereby reducing non-linear distortion of the ferro-electric component and permitting operation at higher power levels. Claims 15-16 and 18 recite that the component coupled to the output of the power amplifier is an isolator, and that the matching circuit matches from about 2 ohms at the power amplifier to about 12.5 ohms at the isolator.

New method claims 19-20 are directed to the novel method of reducing non-linear distortion in a ferro-electric component contained in a matching circuit by integrating the matching circuit and matched component on one substrate.

The Applicant respectfully asserts that claims 3 and 14-20 are patentably distinct from Kim for the additional forgoing reasons.

## **2. Additional Cited References**

Applicant has reviewed the additional cited references: U.S. Patents # 6,101,102 of Brand et al., # 3,739,299 of Adler and # 6,054,908 of Jackson. Applicant asserts that the claimed invention is patentably distinct from the subject matter taught or suggested by the cited references.

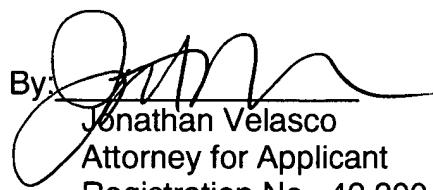
## **Conclusion**

Claims 9-11 were allowed in the parent application, Ser. No. 10/075,507, and are, accordingly cancelled here. Claims 1-8 have been amended. Claims 14-20 have been added. Claims 1-8 and 12-20 are pending. The Applicant respectfully requests a notice of allowance directed to pending claims 1-8 and 12-20.

Should the Examiner believe that prosecution of this application might be expedited by further discussion of the issues, she is invited to telephone the attorney for Applicant at the telephone number listed below.

Respectfully submitted,

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